THE APPLICATION OF THE LINNAEAN NAMES OF SOME NEW WORLD SPECIES OF EUPHORBIA SUBGENUS CHAMAESYCE

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In 1960 Wheeler resurrected a subject which most workers in the *Euphorbiaceae* must have thought long since settled. His proposal, in 1939, to change an established and well understood usage of the name *Euphorbia maculata* L. stirred up a controversy which had died down in print by 1948 (Svenson 1945; Fosberg 1946, 1947; Croizat 1947, 1948), and which Fosberg's rejustification of his earlier stand failed to revive in 1953. In 1962 Croizat answered Wheeler's case with what should have been the final word on the subject, but in the course of a revision of the genus *Chamaesyce* in the Caribbean it has been brought home to me that confusion still exists in American herbaria, and that some collectors are following Wheeler's suggestion even though the case for the change was never proved.

If this were the only Linnaean name whose application to a New World species of *Euphorbia sensu lato* had been questioned the matter would best be allowed to lie, but there are other situations to clarify and, since some of them depend on the use of *E. maculata*, I have reluctantly decided to drag the old bones of the argument out once more.

The other areas which must be discussed are the names for a group of erect, large-leaved plants including *E. hypericifolia* (the name which Wheeler refers to as a "pandora's box" — presumably with some knowledge since he was the last to force its lid closed); the confusion between the Caribbean *E. prostrata* and *E. chamaesyce* of the Old World, and finally a note on the application of the name *E. thymifolia* L. In the interests of brevity, only the relevant parts of earlier papers will be discussed.

Most of the confusion in applying the names proposed by Linnaeus stems from a difference in interpretation of the relative importance of the parts of the material on which

his description was based. Both Svenson (1945) and Stearn (1957) have published very lucid accounts of his descriptive method, pointing out the importance of the phrase-name, not only as a partial characterization of the plant but also as a key to the genus when taken in conjunction with the polynomials of the other species. These phrases were revised to maintain this differentiating function as new material or information was received, and the superseded phrases were put into synonymy.

A mistake commonly made in deciding the application of a Linnaean name is to confuse the need to establish the concept of species which was in the author's mind with the present-day wish to have a single specimen as a representation of the name given to the species. Linnaeus did not work with "type specimens", but based his species on an aggregate of earlier descriptions, illustrations, and actual material. It must be left to a worker familiar with the group, and having a clear understanding of the Linnaean method, to decide just what elements were included by Linnaeus in composing his polynomial phrase-name. Only when this has been done should the specimens now in the herbarium, which may or may not have been present when the *differentiae* were drawn up, be considered in the light of the International Code for designation as types of the names.

1. The application of *Euphorbia maculata* L.

The species to which Linnaeus gave the trivial name "maculata" is number 21 in *Species Plantarum* edition 1. The full entry is made up of the usual polynomial phrase-name and references to earlier works (in this case a description and illustration by Plukenet), an indication of habitat, and also a supplementary description including characters such as color which Dandy suggests to mean that it was taken from fresh material (personal comm. 1964). The author's concept, then, we know to be based on a plant which Plukenet described and illustrated, with the phrase-name rewritten to be comparable with others in the genus, and probably to include information taken from a specimen.

These are the facts in the case, and from this point we move into conjecture.

For many years the name *E. maculata* has been applied to a prostrate plant, a specimen of which is in the Linnaean Herbarium on sheet number 630-11. The sheet is marked "21 maculata", which agrees with the entry in *Species Plantarum*. Most authors have taken the number to be one written on the sheet by Linnaeus, although Savage (1945), in his invaluable catalogue of the herbarium, ascribes it to Sir J. E. Smith. When I examined the specimens last summer I was unable to decide between these two viewpoints, but, in any case, there is general agreement that the epithet "maculata" on the sheet was added by Smith.

There is another sheet, 630-4, on which Linnaeus wrote "17 Euphorbia maculata". In *Species Plantarum* number 17 is the species to which the trivial-name "hypericifolia" was given, and the specimen on the sheet is of one of a group of superficially similar erect species to which Linnaeus applied this name. It is clear that the number and the name on this sheet are contradictory, and that Linnaeus was mistaken in writing one or the other. The choice of which is in error is the first matter for conjecture, but in reaching a decision it should be borne in mind that the number was part of a major work which was in progress or had recently been completed (for it is not certain when the annotation on the sheet was made), while the name was, literally, a trivial name — a new, "shorthand" way of referring to a species, the use of which may still have been unfamiliar to Linnaeus. Wheeler, however, chooses to regard the trivial name as correct, the number as wrong, and on this builds the whole case for his application of the name. In effect, he first selected his type specimen, and then showed that it is feasible that it might have fitted Linnaeus' concept of the species.

Let us instead examine the entry in *Species Plantarum*, keeping in mind the two entities which have been offered as candidates for the name. The polynomial specific name, which was designed to separate the species from all others

rather than as a description, contains no features which positively identify or disqualify either plant. Wheeler was correct in omitting this as a factor in his argument. Consider, however, the position of the species in the genus. Linnaeus was a methodical worker, and his purpose was to distinguish between the discrete groups that he considered species. What better way is there of doing this than by arranging similar things together, and then pointing out the features in which they differ? It is not suggested that Linnaeus followed this plan with complete consistency, but Croizat (1962) has shown in convincing detail that his genus *Euphorbia* is laid out in this fashion. The succulent species fall in the early part, followed by the shrubby types, while in the section *Dichotomae*, species 16-26, the arrangement is even more systematic. Species 16 through 19 are of erect or ascending habit with serrate leaves, species 20 through 24 are prostrate and have various leaf margins, and species 25 and 26 are erect with entire leaves. The placement of 21 *maculata* between 20 *thymifolia* and 22 *prostrata* is strong evidence that the traditional application of the name to the prostrate plant is the correct one to follow.

The descriptive phrase of Plukenet is noncommittal for our purpose of deciding between the two species, and I would agree with Wheeler that the illustration must also be rejected as a decisive factor. However, I feel that he is rash in seizing on features of the italicized description that follows the note on the habitat in *Species Plantarum* to support his choice of a type specimen on which to base the name. In his most recent article (1960) he persists in assuming that one of the two now in the Linnaean Herbarium must be treated as a type specimen in the modern sense. Even if these sheets were in Linnaeus' possession at the time of writing *Species Plantarum*, Wheeler's choice of one over the other because it agrees with parts of the description may be countered by reference to other characters which would support the opposite choice. The shape of the leaves, and the description "subpilosa", for example,

are each more appropriate to the specimen of the prostrate plant on sheet 630-11 than to the other.

Nothing in the original entry in *Species Plantarum*, then, gives grounds for changing the application of the name, and there is sufficient doubt about Linnaeus' view of the specimens now in the herbarium for them to form an unreliable basis for such a drastic step. On the other hand it has been shown that the layout of *Species Plantarum* gives a positive reason for not making such a change, and the application to the prostrate species, affirmed by Jacquin's plate in 1772 and adopted by the vast majority of subsequent authors, should be maintained.

There is one further point that must be discussed before this matter may finally be laid to rest. Both Wheeler (1939, 1960) and Fosberg (1946, 1953), who correctly apply the name *E. hypericifolia* to an erect plant, take the statement "*Euphorbia maculata* similis *E. hypericifoliae*" by Linnaeus in the *Mantissa Altera* (1771) to be selection of the erect element from the two which they feel he had earlier combined under the name *E. maculata*. Croizat's dismissal of this as an irrelevancy (1947, 1948) was not satisfactory, but it was not until I had the opportunity to examine some of the books in the Linnaean Library that I found a reasonable explanation. One of the first books to use differential phrase-names in the manner of Linnaeus was Patrick Browne's *Civil and Natural History of Jamaica* (1756). Stearn (1957) reports that this delighted Linnaeus, who went through the book providing (for his own use in later publications) the *nomina trivialia* that Browne had thought it unnecessary to give. Browne's "Euphorbia 2. Minima reclinata, foliolis ovatis denticulatis . . ." gives as synonym the same "Tithymalus erectus acris . . ., Sloane Cat. 82, & H. t. 126" that Linnaeus included in his 17. *hypericifolia*. In recognition of this, "*E. hypericifolia*" has been written in the margin of this entry, probably by Linnaeus himself. Browne goes on to describe his plant ". . . it is a slender weakly creeper and seldom runs above three or four inches from the root; its branches are smooth and slender and the

leaves small and oval". Here, then, is the basis for the statement in the *Mantissa*. Linnaeus knew "maculata" to be a prostrate plant, and, on reading Browne's description of the plant based on the same element as his "hypericifolia" as a creeper, he simply drew attention to this similarity of habit.

2. The application of the name *Euphorbia hypericifolia* L., and the names for the group of morphologically similar species.

This group, with strong, spreading to erect stems and leaves which are usually toothed, includes at least four species in America. They are distinguishable on pubescence, size of capsule, and on stipule and seed-coat characters, and have somewhat distinct geographical distributions. The names under which they have been known may be summarized thus:

Entity A — northern plant with pubescence only in lines on stem; cyathia never glomerulate; capsules large; seed coat rippled . . . *Euphorbia nutans* Lag.; *E. preslii* Guss.; *E. hypericifolia* L. *sensu* Michaux, Torrey; *E. maculata* L. *sensu* Wheeler.

Entity B — plant of the southern United States to South America; rarely and sparingly pubescent; cyathia never glomerulate; capsules large; seed coat transversely ridged . . . *E. hyssopifolia* L.; *E. brasiliensis* Lam.; *Chamaesyce nirurioides* Millsp.; *C. jenningsii* Millsp.

Entity C — tropical or subtropical plant; rarely pubescent; cyathia glomerulate; capsules small; seed coat wrinkled . . . *E. hypericifolia* L.; *E. pilulifera* L.; *E. glomerifera* (Millsp.) L. C. Wheeler.

Entity D — tropical plant with all herbage close-pubescent; cyathia never glomerulate; capsules large; seed coat transversely ridged . . . *E. lasiocarpa* Klotzsch; *E. hypericifolia* L. *sensu* Wheeler.

The central problem here is the application of the name *E. hypericifolia* L., which has been widely used for both Entity A and Entity C, and which Wheeler proposed in 1939 for Entity D.

Entity B need not be involved in this discussion. It was described by Linnaeus in *Systema Naturae* edition 10 (1759) with the trivial name *hyssopifolia*, and this has been consistently applied by all authors except those who divided the taxon on the basis of leaf shape. Examination of a long series of this highly variable species has so far failed to

substantiate any such division, and the name *E. hyssopifolia* L. should probably be applied throughout.

Wheeler's case for the application of the name *E. hypericifolia* to the pubescent West Indian species, Entity D, was made at a time when neither the Linnaean specimens nor Savage's catalogue was available for study. He examined photographs of the two sheets in the herbarium labelled "hypericifolia," and, having disposed of sheet 630-4 as the type of *E. maculata* L. in the fashion discussed above, he selected the second sheet, 630-3, as the type of the epithet *hypericifolia.* He correctly identified the specimen on this sheet as an example of Entity D, and proposed that the epithet be used for this species. The sheet, however, is marked "Br," indicating that it came from Patrick Browne, most of whose collections were not added to the herbarium until 1758 (Stearn, 1957), and, thus, could not have been considered by Linnaeus when he described his *E. hypericifolia.* Wheeler's proposal may be rejected on these grounds alone.

Entity D was first described by Klotzsch in 1843 under the specific name *E. lasiocarpa.* Grisebach, in his *Flora of the British West Indian Islands* (1864), reduced the taxon to varietal level under *E. hypericifolia* L., but there has been general agreement that it merits specific rank, and that the name used by Klotzsch should be maintained.

The question of the application of "hypericifolia" should also be approached by considering the entry in *Species Plantarum.* The polynomial phrase-name is taken without alteration from Wiman's *Euphorbia, ejusque Historia . . .*, a dissertation published under the supervision of Linnaeus in 1752. The entry here includes even more synonyms than are carried over into *Species Plantarum,* and also a description which makes it clear that a variety α, with almost solitary "flowers", and another β, with "flowers" collected into heads, were recognized and included in the concept of the species. Variety α is probably Entity A, which appears to be the plant described in most of the earlier works of Linnaeus given here as synonyms. Variety β is easily recog-

nisable as Entity C, and this was the plant described and illustrated by Sloane as "Tithymalus erectus acris . . ." and by Commelin as "Tithymalus Africanus, seu Peplis major Brasiliensis . . ." (fide Tab. 10, "Tithymalus Americanus, flosculis albis") to which reference is made in the synonymy. It is clear that Linnaeus held a broad concept of *E. hypericifolia* at the time of publication of Wiman's work and *Species Plantarum,* since the polynomial phrase-name of his earlier works was expanded in these to include features of Sloane's plant.

In a case such as this, where the elements included by Linnaeus are now considered to form more than one species, Stearn (1957) suggests that the choice as to which is to bear the name should take into account not only all parts of the type material, but also the author's intent, and, if possible, subsequent and current usage. We have seen that both Entity A and Entity C are represented in the synonymy, and that while Entity A was the first to be described, this is balanced by the later broadening of the description to include Entity C. There is little in the entry in *Species Plantarum* to guide the choice, and no indication of the author's intent. The usage of the names, however, is another matter. Sir J. E. Smith, who acquired the herbarium in 1783, favored Entity A (Torrey, 1843), and his example was followed by Michaux (1803), Torrey, and a few early American authors. With these exceptions there has been an overwhelming use of *E. hypericifolia* as the name for Entity C, including Crantz' *Institutiones Rei Herbariae* (1766), Miller's *Gardener's Dictionary* edition 8 (1768), Aublet's *Histoire des Plantes de la Guiane Française* (1775), Humboldt's *Nova Genera . . .* (1817), Hooker's *Exotic Flora* (1823), and Boissier in DC. *Prodromus* (1862). In fact, the usage is so firmly established that it would be very much against the interests of stability of nomenclature to consider making any change, and the name *E. hypericifolia* L. should continue to be applied to this subtropical, erect plant with small capsules usually borne in glomerules. Sloane's illustration, cited by Linnaeus in *Species Plantarum,* is an ap-

propriate lectotype for the name used in this fashion, and the specimen on which the illustration was based, if it still exists in the Sloane Herbarium in the British Museum, would constitute what Dandy has referred to as a "typotype" (Stearn, 1957).

The name for Entity A remains to be decided. The varietal status accorded it by Linnaeus was not questioned for a number of years, but in 1816 Lagasca described a taxon under the specific name *E. nutans*. Wheeler (1941) reports that he examined a specimen which probably represents the plant that Lagasca described, and concluded that the name was apparently based on unusually vestite plants of Entity A. On these grounds the name *E. nutans* Lag. will be adopted for this species, with the more commonly used but later name *E. preslii* Guss. passing into synonymy.

In summary, then, the names for this group of species are as follows:

Entity A (Northern plant with large capsules) — *E. nutans* Lag.
Entity B (Southern plant with large capsules) — *E. hyssopifolia* L.
Entity C (Tropical plant with small capsules) — *E. hypericifolia* L.
Entity D (Tropical plant which is densely pubescent) — *E. lasiocarpa* Klotzsch.

3. *Euphorbia prostrata* Ait. and *E. chamaesyce* L.

Wheeler suggested in 1941 that these two species are conspecific, basing his case on the fact that one of the two sheets labelled "chamaesyce" in the Linnean Herbarium (sheet 630-17) is actually a specimen of the plant which has been known as *E. prostrata* Ait. This sheet, however, is another of Brown's specimens, and was not in Linnaeus' possession until long after his description of *E. chamaesyce* in *Species Plantarum*. The other sheet (630-15) is a good example of the European species to which the name has usually been applied, and nothing in the original entry suggests that Linnaeus intended the limits of his species to be set broad enough to include the West Indian plant.

The two species are, in fact, quite distinct, and the annotation by Linnaeus on sheet 630-17 is a simple misidentification. Croizat (1945) has documented the consistent use of the two names for the distinct entities, and there seems

little room for argument against maintaining *E. chamaesyce* L. as the name for a Mediterranean plant not so far found in the New World, and *E. prostrata* Ait. as the name for a weed of the Old and New World tropics. Wheeler accepts this usage in a supplement to the second edition of Kearney & Peebles *Arizona Flora* published in 1962, but his correction has been overlooked by the authors of other floras which have appeared since that date.

4. Application of the name *E. thymifolia* L.

Wheeler (1941) drew attention to a suggestion by A. Gray that the specimens 630-10 "Euphorbia 20 thymifolia" and 630-11 in the Linnaean Herbarium are of the same entity. An examination of the sheets confirmed this, and that both are the prostrate *E. maculata* L. There is no specimen in the Herbarium of the plant which has traditionally been called *E. thymifolia* L., and the protologue in *Species Plantarum* is of little direct help in deciding the application of the name. The polynomial phrase-name and descriptions by Burmann and Plukenet indicate that the plant is prostrate and pubescent, with serrate leaves and "flowers" somewhat collected into groups, and the illustrations cited fit these descriptions but show no characters which are diagnostic.

Burmann, however, includes in his synonymy "Chamaesyce, Sloane Cat. 83". This was based on a specimen from St. Jago de la Vega, now in the Sloane Herbarium, which is cited by Fawcett and Rendle in *Flora of Jamaica* (1920) as an example of *E. thymifolia* L. in the sense in which the name is used by most authors. This gives a positive link between the name and a well-understood taxon, and since no other such link can be made, and since nothing in the protologue contradicts this usage, it seems reasonable to accept it even though Sloane's plant was probably not seen by Linnaeus (Stearn, 1957).

The plant to which this name has been applied is found in most tropical regions, and is distinguished from similar species by the shortness of the stalk of the female flower, which forces the cyathium to split down one side as the

capsule develops. Bernard, *Icones Bogorienses,* 4, t. 315. 1910, illustrates this character well. Grisebach, in his *Flora of the British West Indian Islands* (1864), treats the taxon as a variety *thymifolia* of *E. maculata* L., but Boissier in DC. *Prodromus* (1862), Drury in *Handbook of the Indian Flora* (1869), Urban in *Symb. Antill.* (1910), and most subsequent authors consider that it merits specific rank. This usage is now so widespread and so well understood that nomenclatural stability will be best served by maintaining it, unless some contrary intention on the part of Linnaeus can be shown.

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LITERATURE CITED

CROIZAT, L. 1945. "Euphorbia chamaesyce" in the United States. Bull. Torr. Bot. Club **72:** 312-318.

———. 1947. *Euphorbia maculata* L. Bull. Torr. Bot. Club **74:** 153-155.

———. 1948. *Euphorbia maculata:* A rejoinder. Bull. Torr. Bot. Club **75:** 188.

———. 1962. Typification of *Euphorbia maculata* L. A Restatement and a Conclusion. Webbia **17:** 187-205.

FOSBERG, F. R. 1946. Application of the name *Euphorbia maculata* L. Rhodora **48:** 197-200.

———. 1947. *Euphorbia maculata* again. Bull. Torr. Bot. Club **74:** 332-333.

———. 1953. Typification of *Euphorbia maculata* L. Rhodora **55:** 241-243.

JACQUIN, N. J. 1772. Hortus Botanicus Vindobonensis **2:** 87, t. 186. Vienna.

KLOTZSCH, J. F. 1843. Nov. Act. Nat. Cur. **19:** (supp. 1): 414.

LAGASCA, M. 1816. Genera et Species Plantarum . . . 17. Madrid.

LINNAEUS, C. 1753. Species Plantarum ed. 1. Stockholm.

———. 1771. Mantissa plantarum altera. Stockholm.

MICHAUX, F. A. 1803. Flora boreali-americana. Paris.

SAVAGE, S. 1945. A catalogue of the Linnaean Herbarium. London.

STEARN, W. T. 1957. An introduction to the Species Plantarum and cognate botanical works of Carl Linnaeus. (Introduction to Ray Society facsimile of Species Plantarum ed. 1). London.

SVENSON, H. K. 1945. On the descriptive method of Linnaeus. Rhodora **47:** 273-302, 363-388.

TORREY, J. 1843. Flora of the State of New York. Albany.

WHEELER, L. C. 1939. A miscellany of the New World Euphorbiaceae — II. Contr. Gray Herb. **127:** 48-78.

———. 1941. *Euphorbia* subgenus Chamaesyce in Canada and the United States exclusive of southern Florida. Rhodora **43:** 97-154, 168-205, 223-286. (Reprinted as Contr. Gray Herb. **136**).

———. 1960. Typification of *Euphorbia maculata*. Rhodora **62:** 134-141.